Do Prior Attitudes Matter for Mental Health after Teen Childbirth?

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ABSTRACT

The relationship between teen childbearing and mental health has been extensively studied; however, little is known about how individual attitudes shape this association. This study used data from Add Health to investigate whether the relationship between teen childbearing and adult depression is moderated by adolescent attitudes toward becoming pregnant. The results showed that, controlling for selection into teen childbearing, women who had first births between ages 16 and 19 experienced no more depressive symptoms in adulthood than women who had first births at age 20 or older. Furthermore, among women who had positive adolescent pregnancy attitudes, those who had teen births experienced greater declines in depression than those who had adult first births. Additionally, this paper examined variation in these findings by race/ethnicity and SES.

Do Prior Attitudes Matter for Mental Health after Teen Childbirth?

Teenage childbearing is an issue that has long captured the attention of sociologists, policy makers, and the public. The teen birth rate has been declining in the United States for the past two decades; however, the U.S. continues to have the highest teen birth rate among industrialized countries (Kearney and Levine 2012). In the United States in 2009, 39 out of 1,000 women aged 15-19 experienced a teen birth (Child Trends 2011). Adolescent births tend to be concentrated among the most disadvantaged women in our society. Adolescents from poorer families are much more likely to give birth as a teen than are those from higher income families (e.g., Trent and Crowder 1997; Mollborn and Morningstar 2009). Teen birth rates are also higher among black and Hispanic adolescents than among white adolescents (Child Trends 2011). Of the teen births that occurred in the United States in 2009, 87% occurred to unmarried mothers (Child Trends 2011). There seems to be a general consensus in public opinion that teen childbearing is bad for the individual and for society, especially when it takes place outside of marriage. One outcome which has received attention is maternal mental health. Both adolescent childbearing and nonmarital childbearing have been associated with poorer maternal mental health (e.g., Mirowsky and Ross 2002; Kalil and Kunz 2002; Carlson and Williams 2011).

These findings seem to validate the existing concern about teenage childbearing; however, past studies have not typically taken into account the heterogeneity of teenage women's experiences with childbearing. Specifically, past research has generally neglected the role of adolescents' attitudes in shaping their reactions to having a birth as a teenager. Research has demonstrated that some adolescents hold positive or ambivalent attitudes toward teenage pregnancy (Jaccard, Dodge, and Dittus 2003). Furthermore, these attitudes vary by

race/ethnicity and socioeconomic status: black and Hispanic adolescents have more positive attitudes toward teen pregnancy than white adolescents and adolescents from lower socioeconomic status families have more positive attitudes toward teen pregnancy than their higher socioeconomic status peers (Jaccard et al. 2003). Geronimus (2003) has argued that teen childbearing is actually adaptive for poor African American women, and thus positive norms about teenage pregnancy exist among this group. This study examines whether teen childbearing remains detrimental to mental health when adolescent pregnancy attitudes are taken into account. It also investigates racial/ethnic and socioeconomic status differences in pregnancy attitudes and mental health.

A major contribution of this study will be to examine these dynamics among adolescents from the National Longitudinal Study of Adolescent Health (Add Health). To my knowledge, no study has used Add Health to investigate the relationship between pregnancy attitudes and adult mental health among women who had teen births. This longitudinal, nationally representative dataset is well suited for the current investigation. It contains measures of adolescents' pre-pregnancy attitudes toward becoming pregnant, as well as their complete pregnancy histories collected at later waves. Wave 4, collected in 2008, is the first wave in which all of the participants were over 19 years old; therefore, completed teenage fertility can be assessed for all participants.

LITERATURE REVIEW

Implications of Teen Childbirth for Mental Health

Stress process theory provides a useful framework for understanding both the influence of teen childbearing on mental health and the potential moderating role of prior attitudes. According to stress process theory, stressors lead to stress, which is a biological process that in

turn produces the psychological outcome of distress (Pearlin 1999). Stressors can take the form of life events or chronic strains. Life events are specific one-time occurrences, such as the birth of a child. Chronic strains are defined by Pearlin (1989) as "the relatively enduring problems, conflicts, and threats that many people face in their daily lives" (p. 245). Teen childbearing can be conceptualized as both a life event and a chronic strain. Within this framework, becoming a parent is a major life event stressor. Furthermore, being a young, and most likely unmarried, parent can be a chronic strain, as parenting requires substantial emotional and financial resources, which teen parents often lack. Research has repeatedly shown that women who experience teen births end up with lower educational attainment and lower income than women who do not experience teen births (e.g., Hoffman, Foster, and Furstenberg 1993; Klepinger, Lundberg, and Plotnick 1995; Klepinger, Lundberg, and Plotnick 1999; Fletcher and Wolfe 2009). This puts teen mothers in an economically disadvantaged situation, which represents both an additional chronic strain, and a lack of resources to deal with the strain of parenting.

Consistent with the prediction of stress process theory, research has shown that adolescent childbearing is associated with poorer maternal mental and physical health. Teenage childbearing has been associated with higher depressive symptoms in adulthood (Mirowsky and Ross 2002), poorer midlife health (Taylor 2009), and an increased risk of death at older ages (Henretta 2007). Considering that the vast majority of adolescent births are nonmarital, it is also relevant that research has found a negative association between nonmarital childbearing and maternal mental and physical health (Avison, Ali and Walters 2007; Williams et al. 2011). Avison et al. (2007) found that single mothers experienced more stressors than married mothers and these stressors predicted the higher levels of psychological distress that were observed among single mothers.

Importantly, other researchers that have examined the relationship between adolescent childbearing and mental health have come to a different conclusion. According to these studies, any negative association between teenage childbearing and mental health can be explained by the selection of disadvantaged women into teen childbearing (e.g., Mollborn and Morningstar 2009; Taylor 2009). Mollborn and Morningstar (2009) argued that the relationship between teen childbearing and depression is spurious; compared to their peers who delayed childbearing past their teenage years, young women who had teen births were more depressed both before and after the transition to teenage parenthood.

The lack of consensus in the literature about the consequences of teen childbearing for mental health suggests a need for additional research. Neither approach—those that directly address selection or those that ignore it—has considered the likely situation of heterogeneity in the causal effect of teen childbearing on mental health. The relative balance of selection and causation in producing the observed association likely varies for different groups. Therefore what is needed is research that both considers differential selection into teen childbearing and explores important sources of heterogeneity in the causal and selection effects. It is possible that teen childbearing undermines mental health for some women but not for others.

Fertility Attitudes/Expectations, Parenthood Status, and Mental Health

While stress process theory predicts that teen childbearing will undermine mental health on average, several of its central tenets lead to predictions of substantial heterogeneity in these average associations as a function of women's prior attitudes toward teen pregnancy. Proponents of stress process theory believe that health disparities can be explained by differential exposure to stressors (Pearlin et al. 2005); however, the extent to which an event is stressful depends on individual subjective appraisals (Lazarus and Folkman 1984). For example, Martinez-Torteya et

al. (2009) found that among women who experienced intimate partner violence, subjective stressfulness appraisal was a better predictor of depressive symptoms than intimate partner violence frequency or severity. Along the same line of reasoning, stress researchers maintain that life events are especially stressful if they are undesirable and/or unexpected (Pearlin 1999). Furthermore, while having a teen birth is a life event, being a parent is an ongoing role. According to Pearlin (1989), roles can be stressors if they are occupied unwillingly. This is a specific type of chronic strain called role captivity. The implication of these theories is that having a child as an adolescent will only lead to distress if it is experienced as a stressor, which requires women to appraise it as a negative event and/or experience role captivity.

Another relevant concept from stress process theory is stress proliferation, which Pearlin, Aneshensel, and LeBlanc (1997) define as "the expansion or emergence of stressors within and beyond a situation whose stressfulness was initially more circumscribed" (p. 223). In their study of AIDS caregivers, Pearlin et al. (1997), found that the primary stressor of role captivity indirectly affected depression through its effect on the secondary stressor of work strain. This suggests that if teen childbearing is experienced as a stressor, it may lead to secondary stressors through the process of stress proliferation. Raising a child requires substantial resources, which are often lacking among teen mothers in particular. If they are already distressed by an unwanted birth, the additional economic and emotional strains of parenthood could lead to further distress. In summary, stress process theory predicts that women who had positive attitudes toward becoming pregnant as teens will be less distressed after teen childbearing than their peers who had negative adolescent attitudes toward becoming pregnant.

Self-discrepancy theory also leads to the prediction that attitudes toward becoming pregnant will affect mental health adjustment after the transition to parenthood. According to

self-discrepancy theory, individuals compare their actual selves to their ideals selves and it is potentially problematic if there are discrepancies between the two (Higgins 1987). Higgins (1987) wrote that "if a person possesses this discrepancy, the current state of his or her actual attributes, from the person's own standpoint, does not match the ideal state that he or she personally hopes or wishes to attain… and thus the person is predicted to be vulnerable to dejection-related emotions" (p. 322). From this perspective, an individual who has a positive attitude toward becoming pregnant as a teenager will have little discrepancy between her actual and ideal selves if she does have a teen birth. Consequently, teen childbearing should be much less detrimental to mental health in this situation.

The existing research on unwanted childbearing supports these predictions: unwanted childbearing has been linked to higher maternal parenting stress (East, Chien, and Barber 2012) and poorer maternal mental health (Najman et al. 1991; Barber, Axinn, and Thornton 1999; Maxson and Miranda 2011). However, this body of research has several weaknesses including: 1) the use of clinical samples rather than national probability samples; 2) the use of cross-sectional data which fails to account for selection into unintended childbearing; and 3) the reliance on retrospective reports of wantedness from women during pregnancy or after childbirth (see Gipson, Koenig, and Hindin 2008 for a review). Retrospective reports of pregnancy wantedness are problematic because women can change their minds about wantedness (in either direction) after the child is born. Furthermore, a woman who is depressed at the time that she is asked about wantedness may be more likely to report that her child was unwanted.

The ideal solution to avoid concerns about retrospective reporting bias is to ask women whether they want to get pregnant before they experience a pregnancy. Unfortunately, due to data limitations, researchers have typically used other questions to approximate a prospective

measure of wantedness, such as fertility expectations (e.g., Trent and Crowder 1997; East 1998; Carlson and Williams 2011) or fertility attitudes (e.g., Jaccard et al. 2003). Although these measures do not exactly capture pregnancy wantedness, there is some evidence that they are related concepts. Trent and Crowder (1997) found that adolescents who indicated that they expected to have teen or nonmarital births were significantly more likely to do so. Similarly, Jaccard et al. (2003) showed that holding less negative attitudes toward teen pregnancy was associated with a higher likelihood of becoming pregnant as a teen. These studies show a strong association between pregnancy attitudes and expectations and actual behavior, suggesting that these measures capture some aspects of wantedness or intendedness.

To my knowledge, no research has examined the relationship between adolescent attitudes toward becoming pregnant and mental health after teen childbirth. There are two studies about how fertility expectations shape mental health outcomes among parents (Carlson and Williams 2011; Mossakowski 2011). Although these studies do not focus on teenage childbearing, they can inform the present study.

Carlson and Williams (2011) and Mossakowski (2011) both used data from the 1979 National Longitudinal Survey of Youth (NLSY79) to examine the relationship between fertility expectations, parenthood status, and mental health. Both studies used measures of fertility expectations that were obtained during adolescence, before the transition to parenthood. Mossakowski (2011) compared answers to a question about whether one expected to become a parent in the next five years to actual parenthood status five years later to determine if individuals' expectations were met. The results indicated that individuals who became parents unexpectedly as teenagers or early adults had significantly higher depressive symptoms in adulthood than individuals who met their parenthood expectations, even when controlling for

baseline mental health. Similarly, Carlson and Williams (2011) found that, on average, earlier than expected first births were associated with higher depressive symptoms than first births that occurred at the age they were expected; however this finding was only significant for white and Hispanic individuals. In fact, for black individuals, earlier than expected first births were actually associated with fewer depressive symptoms than on-time first births.

The studies by Carlson and Williams (2011) and Mossakowski (2011) suggest that discrepancies between the expected and actual self, or unexpected life events, do undermine mental health. This is in line with predictions made by both stress process theory and self-discrepancy theory. These studies suggest that we should look beyond the average associations between transitions to parenthood and mental health. While these studies make very important contributions to the literature, their results cannot be generalized to my research question because they do not focus on teen childbearing. Also, both studies analyze fertility expectations, which are conceptually different from attitudes toward becoming pregnant. One could expect to become pregnant without necessarily having a positive attitude toward becoming pregnant. Finally, both studies use the NLSY79, which is a longitudinal study of individuals who were 14 to 22 years old in 1979. Due to social and demographic changes that the United States has experienced in the intervening years, it seems likely that attitudes toward teen pregnancy, and their implications, may be different among a more recent cohort of adolescents.

Normative Variation by SES and Race/Ethnicity

The life course perspective provides a more structural framework for understanding why teen childbearing could be detrimental to mental health. The life course perspective focuses on role entries and exits over the life course, and assumes that a normative life course order exists and people are aware of it (Elder 1975). According to Elder (1975), "social prescriptions in the

timing of events or role transitions in the life course lead to the hypothesis that adverse outcomes are associated with pronounced deviations from the approved time schedule, with transitions that occur too early or late" (p. 175). This perspective suggests that women who have teen births will have poorer mental health than women who follow the normative life course pathway, partly because of social sanctions or lack of social support for making an early and out-of-order transition. Furthermore, women who postpone childbearing until after they have entered the labor force and married have acquired valuable financial resources from these prior transitions that can make the transition to parenthood less stressful, while women who have teen births do not usually have the benefit of having experienced these prior transitions (Elder 1975).

In light of the substantial demographic changes in family formation patterns since Elder's (1975) original work, researchers in the life course tradition have observed that there exists no single normative life course pathway. Both qualitative and survey-based studies have revealed that teen childbearing may be considered a normative alternative pathway for some disadvantaged groups of women, including poor women and racial/ethnic minority women (Burton 1990; Geronimus 2003; Jackson 2004; Edin and Kefalas 2005). For women who face a dearth of marriageable men and few opportunities for educational or occupational advancement, teen childbearing seems to represent a socially acceptable option.

Studies that have examined racial and socioeconomic status variation in expectations and attitudes toward teenage pregnancy have produced similar findings. East (1998) found that early adolescent girls of different racial and ethnic backgrounds expected different life course patterns. Controlling for socioeconomic status, black adolescents perceived a higher likelihood of nonmarital childbearing compared to white adolescents, and Hispanic adolescents reported an earlier best age of childbirth compared to white adolescents (East 1998). Trent and Crowder

(1997) also found that black and Hispanic female adolescents were more likely to expect adolescent and nonmarital births than white adolescents. Compared to white adolescents, black and Hispanic adolescents have also been shown to have less negative attitudes toward becoming pregnant as teens (Jaccard et al. 2003) and to report less embarrassment at the prospect of teen pregnancy (Mollborn 2010). There is also evidence that female adolescents from lower socioeconomic status families are more likely to expect teen and nonmarital births (Trent and Crowder 1997), have more positive attitudes toward teen pregnancy (Jaccard et al. 2003), and rate teen pregnancy as less embarrassing (Mollborn 2010) compared to their higher socioeconomic status peers. These studies provide further evidence that social norms about life course ordering and transitions to parenthood vary by race, ethnicity, and socioeconomic status.

In summary, there is no consensus among researchers about whether teen childbearing is detrimental to mental health (e.g., Mirowsky and Ross 2002; Mollborn and Morningstar 2009). This paper argues that there is likely to be substantial variation in mental health adjustment to teen childbearing according to adolescent attitudes toward becoming pregnant. Research has shown that unwanted childbearing is associated with poorer maternal mental health (Najman et al. 1991; Barber et al. 1999; Maxson and Miranda 2011); however these studies used retrospective measures of wantedness which have serious limitations. Research has also shown that prospectively measured fertility expectations predict mental health after the transition to parenthood (Carlson and Williams 2011; Mossakowski 2011); however, these studies did not focus on teen childbearing or examine attitudes toward becoming pregnant. Finally, research has shown that expected, desired, and ideal life course patterns differ by race, ethnicity, and socioeconomic status (East 1998; Trent and Crowder 1997; Jaccard et al. 2003; Mollborn 2010) and that the association between fertility expectations and mental health after the transition to

parenthood varies by race/ethnicity (Carlson and Williams 2011). The current study investigates whether adolescent attitudes toward becoming pregnant are predictive of mental health adjustment after teen childbirth, as well as whether this association varies by race/ethnicity or socioeconomic status. These questions are addressed using a contemporary sample of adolescents from Add Health.

HYPOTHESES

Based on the predictions of theory and my review of the literature, I expect that:

1. Teen childbearing will be associated with more depressive symptoms compared to adult childbearing but the association will be weaker among those with more positive pre-pregnancy attitudes toward teen pregnancy.
2. The association of teen pregnancy attitudes with depressive symptoms after teen childbirth will vary by race/ethnicity.
3. The association of teen pregnancy attitudes with depressive symptoms after teen childbirth will vary by adolescent socioeconomic status.

DATA AND METHOD

Sample

Data are from the National Longitudinal Study of Adolescent Health (Harris 2009). Add Health is a longitudinal survey of adolescents based on a nationally representative sample of U.S. schools. The first wave was conducted in 1995 when participants were in grades 7-12. The second wave was conducted in 1996 when participants were in grades 8-12 and the third wave was conducted in 2002 when participants were aged 18-28 years. The fourth and most recent wave was conducted in 2008 when participants were aged 24-34 years. Of the original 20,745 Wave 1 respondents, 15,701 participated in Wave 4 and 14,800 had non-missing sample weights.

The sample for this study consists of female respondents who participated in both Waves 1 and 4, and reported a first birth between Waves 1 and 4. The analysis was limited to white, black, and Hispanic respondents. Respondents were excluded from the sample if they reported that their first live birth occurred before Wave 1 or within nine months after Wave 1 (n = 314). Bivariate statistical tests revealed that these women were significantly more disadvantaged than the women who had teen first births that were included in the analysis. Compared to the teen mothers in the analytic sample, the women who had first births before Wave 1 were significantly more likely to be black, more likely to be from families receiving public aid, more likely to have parents with unknown education, less likely to be from two biological parent families, less likely to be from step-families, and more likely to be from "other" family structures. They also had their first births at age 16.6 on average, almost two years earlier than the mean age at first birth of the teen mothers in the analytic sample (18.2 years). Finally, the women who had first births before Wave 1 were significantly less likely to be married or cohabiting at the time of the pregnancy/birth than the teen mothers in the analytic sample.

There were 3,733 women who had first births between Waves 1 and 4. Of these women, 953 (26%) had teen births, defined as births before age 20. The sample was reduced by a large number of missing values for the pregnancy attitudes question, which was only asked of respondents ages 15 and older at Wave 1. In total, 1,024 women in the sample, or 27% of the sample, were missing responses to this question; all but 11 of these missing responses were attributable to the survey skip pattern that omitted the pregnancy attitudes questions for respondents that were younger than 15 years old. After listwise deletion of missing responses to the pregnancy attitude question, there were 2,709 women in the sample, including 560 women who reported teen first births. After listwise deletion of respondents with missing data on the

rest of the variables, the final analytic sample consisted of 2,683 women who reported first births between Waves 1 and 4, including 554 women who reported teen first births. Age at first birth in the analytic sample ranged from 16 to 19 years old for the women who had teen first births and from 20 to 33 years old for the women who had adult first births.

In total, 399 women who had teen first births were excluded from the analysis due to missing data, primarily because they were too young at Wave 1 to be asked about pregnancy attitudes. Bivariate statistical tests revealed few significant differences between these women and the teen mothers that were included in the analysis. The women who had teen first births but were excluded from the analysis due to missing data were significantly less likely to be from families where public aid status was unknown and less likely to be from "other" family structures. They also were younger on average at Wave 1 than the teen mothers in the analytic sample, which can be explained by the fact that younger girls were not asked about pregnancy attitudes. Finally, women who had teen first births but were excluded from the analysis due to missing data had their first birth at age 17.5 on average, while the teen mothers in the analytic sample had their first birth at age 18.2 on average.

Dependent Variable

Adult mental health. Mental health was measured at Wave 4 using a ten-item version of the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff 1977). The CES-D asks respondents to rate how often, from 0 "never or rarely" to 3 "most of the time or all of the time," they experienced certain feelings. For example, one item asks how often "you felt that you were too tired to do things." There were only six missing responses for all ten CES-D items combined. If respondents were missing answers to no more than four of the ten items, I substituted the within-individual mean for missing responses. After this process there were no

missing values for any of the ten CES-D items. I then summed the responses to the ten items to create a scale with possible values from zero to thirty. The scale reliability coefficient was 0.84.

Explanatory Variables

Pregnancy attitudes. Adolescent pregnancy attitudes were measured at Wave 1 by a question that asked respondents how much they agreed with the following statement: "It wouldn't be all that bad if you got pregnant at this time in your life." Responses to this question were reverse-coded so that 0 represents "strongly disagree" and 4 represents "strongly agree." Thus, a higher numerical value for this item represents more positive attitudes toward teen pregnancy. For the sake of efficiency, some models include a dichotomous version of this item where 0 indicates a negative adolescent pregnancy attitude and 1 indicates a neutral or positive adolescent pregnancy attitude.

Teen childbirth. A respondent was classified as having experienced a teen birth if she was under age twenty at the date of her first live birth. Each respondent provided a pregnancy history, which was used to identify the date of her first live birth. The child's birth date was then compared to the respondent's birth date to calculate the respondent's age at first birth.

Race. Race is measured with dummy variables constructed from two questions: the first asked if the respondent was of Hispanic ethnicity and the second asked the respondent to identify with one or more racial categories. As suggested by the Add Health documentation, the following order of preference was used to assign each respondent to a single racial/ethnic category: Hispanic, black, Asian, Native American, other, white. The analysis was limited to white, black, and Hispanic respondents. The reference category in all analyses is white.

Family socioeconomic status. Two Wave 1 measures of family socioeconomic status were included in models: family receipt of public aid and parental education. An indicator of

whether the adolescent's family received public aid was constructed from parents' responses to three items asking whether they received AFDC, food stamps, or public assistance. If the parent answered yes to receiving any of these three types of aid, the adolescent was coded as receiving public aid. Due to a high number of missing responses to this question, I also included a dummy variable for unknown family receipt of public aid. The reference category in all analyses is no family receipt of public aid.

The parental education variable was constructed from the adolescents' reports of educational attainment for their resident mother and resident father. The highest non-missing value for resident mother's and resident father's education was used to create a single parental education variable. Parental education was included in the analyses as a series of dummy variables, including a dummy variable for unknown parental education. The reference category in all analyses is less than high school parental education.

Control Variables

Wave 1 mental health. Mental health was measured at Wave 1 using a nineteen-item version of the CES-D. For the sake of consistency, I used only the ten items that were administered at Wave 4 when constructing the Wave 1 CES-D scale. If respondents were missing answers to no more than four of the items, I substituted the within-individual mean for missing responses. I then summed the responses to the ten items to create a scale with possible values from zero to thirty. The scale reliability coefficient was 0.83.

Adolescent family structure. There is evidence that adolescents from two-parent families are less likely to expect adolescent births than those from other family structures (Trent and Crowder 1997); therefore a Wave 1 measure of family structure was included in models as a control variable. This variable was constructed from adolescent reports on the household roster.

All adolescents were classified as living in one of the following four family structures: 1) two biological or adoptive parents; 2) step-family (including cohabiting step-families); 3) single parent; or 4) other family structure. The reference category in all analyses is two biological or adoptive parents.

Religiosity. Both attitudes toward teen pregnancy and mental health after a teen birth are likely to vary according to the religiosity of the adolescent; therefore a Wave 1 measure of religiosity was included in models as a control variable. This item asked respondents to report how important religion is to them. Responses to the item were reverse-coded, so that 1 represents "not important at all" and 4 represents "very important." Respondents who were missing responses to this item because they reported that they had no religion were coded as "not important at all."

Age at Wave 1. Age at Wave 1 was also included in models as a control variable, as women who had teen births were slightly younger at Wave 1 than those who had adult births and age may also influence attitudes toward teen pregnancy and depressive symptoms.

Time from Wave 1 to first birth. The number of months from the Wave 1 interview until the respondent's first birth was included in the models to control for the amount of time between the measurement of adolescent pregnancy attitudes and the event of first birth.

Marital/cohabitation status at first birth. For each pregnancy they reported, respondents were asked whether they were married to the child's father at the time of the pregnancy/birth. Unmarried respondents were asked whether they were cohabiting with the child's father at the time of the pregnancy/birth. These two dichotomous variables were included in all models to control for marital and cohabitation status at first birth.

I chose not to include any additional Wave 4 controls in this analysis. It would have been possible to include indicators such as current marital status, current socioeconomic status, total number of children, and co-residence with the first-born child; however, both research and theory suggest that these are mechanisms through which teen birth affects adult mental health. Thus, including Wave 4 characteristics in the models would underestimate the true gross association of adolescent childbearing with depression.

Analytic Strategy

I used ordinary least squares regression with a lagged dependent variable to investigate the relationship between Wave 1 attitudes toward teen pregnancy and Wave 4 depressive symptoms among women who had teen and adult first births between Waves 1 and 4. I used survey estimation with sampling weights in STATA 13 to generate descriptive statistics for all variables and to estimate the OLS models. To complement the OLS models, I also used STATA 13 to estimate weighted fixed effects models with standard errors adjusted for the clustered sample design.

RESULTS

Table 1 presents weighted descriptive statistics for all of the variables in this analysis for the full sample and separately for the subsamples of women who had teen and adult first births. Examination of these descriptive statistics reveals some mean differences between the women who had teen births and the women who had adult births. The women who had teen first births were more depressed at both Waves 1 and 4, compared to the women who had adult first births. Women who had teen first births also had more positive attitudes toward teenage pregnancy at Wave 1. Women who had teen first births were less likely to be married and more likely to be cohabiting at the time of the first birth, compared to women who had adult first births. A higher

proportion of the women who had teen first births were black and a lower proportion were white, compared to the women who had adult first births. The women who had teen first births were also more likely to be from families that were receiving public aid at Wave 1 and their parents generally had less education. Compared to women who had adult first births, a smaller proportion of the women who had teen first births were from two biological or adoptive parent families, and the proportions from the other family structures were larger. The women who had teen first births had a slightly lower mean age at Wave 1 than the women who had adult first births. This is an artifact of the way the analytic sample was selected.

(Table 1 about here)

Before proceeding to the multivariate analysis, I examined the mean change in CES-D score from Wave 1 to Wave 4 for women who had teen and adult first births, separately by adolescent pregnancy attitude scores. Figure 1 presents weighted boxplot graphs of these means. The first finding from Figure 1 is that average depressive symptoms declined over time for all groups. The second finding is that among women who had strongly positive adolescent pregnancy attitudes, women who had teen first births experienced significantly greater declines in depressive symptoms compared to women who had adult first births. Among women who had negative, neutral, or moderately positive adolescent pregnancy attitudes, the differences in CES-D change scores between women who had teen and adult first births were not significant.

(Figure 1 about here)

Table 2 presents results of a series of OLS models investigating the relationship between adolescent attitudes toward becoming pregnant and adult depressive symptoms among women who had first births between Waves 1 and 4. In Model 1, Wave 4 depressive symptoms were regressed on the teen birth dummy variable, adolescent pregnancy attitudes, Wave 1 depressive

symptoms, and controls. Although the bivariate analysis indicated more Wave 4 depressive symptoms among women who had a teen first birth compared to an adult first birth, this association became nonsignificant when controls (including pre-birth depressive symptoms) were included.

(Table 2 about here)

In Model 2, Wave 4 depressive symptoms were regressed on the teen birth dummy variable, adolescent pregnancy attitudes, an interaction term between the teen birth and pregnancy attitudes variables, and Wave 1 depressive symptoms. The coefficient for the teen birth dummy variable was significant. This means that among women who held the most negative pregnancy attitudes as adolescents, women who ended up having teen births experienced 1.36 more depressive symptoms on average in adulthood than women who waited until at least age 20 to have their first births, controlling for Wave 1 depressive symptoms. However, the mental health advantage associated with having an adult first birth compared to a teen first birth significantly diminishes as pregnancy attitudes become more positive. Each one unit increase in (the positivity of) pregnancy attitudes reduces the difference between women with teen births and women with adult births in Wave 4 depression by 0.90 symptoms, controlling for Wave 1 depressive symptoms.

In Model 3, the control variables were added to Model 2 in order to partially control for selection into teen childbearing. The main coefficient of interest, the interaction term between teen birth status and adolescent pregnancy attitudes, remained significant, although it decreased somewhat in magnitude from -0.90 in Model 2 to -0.78 in Model 3. On the other hand, inclusion of the control variables rendered the coefficient for teen birth nonsignificant. Thus, for women who expressed strongly negative adolescent attitudes toward pregnancy, the difference in Wave

4 depressive symptoms between those who had teen and adult first births was completely explained by selection of more disadvantaged women into teen childbearing.

Figure 2 provides a graphical representation of the interaction term from Model 3. Figure 2 shows the predicted depressive symptoms for women based on their adolescent attitude toward teen pregnancy and whether or not they had their first births as teenagers, holding all other variables in the model at their means. This graph shows that among women with the most negative adolescent attitudes toward teen pregnancy, women who had their first births as teenagers were more depressed than women who had their first births at age twenty or older, although this difference was not significant. Among women who had positive attitudes toward teen pregnancy, women who had their first births as teenagers were significantly less depressed than women who had their first births as adults. In summary, Model 3 suggests that after controlling for factors that select women into teen childbearing, there are no negative effects of teen childbearing on depressive symptoms and in fact there are positive effects of teen childbearing on depressive symptoms for those who had positive adolescent attitudes toward becoming pregnant.

(Figure 2 about here)

There is some concern among statisticians that lagged dependent variable models may produce biased estimates of the effects of transitions (see Johnson 2005). In light of this concern, I also estimated fixed effects models predicting adult depressive symptoms from change in teen parent status and adolescent pregnancy attitudes. Fixed effects models control for all unobserved heterogeneity between individuals and thus present within-person estimates of the effects of change. As a result, all time-invariant controls were dropped from these models, leaving only age as a control. Table 3 presents the results of these models. Model 1 shows that

there is no significant difference between women who had teen and adult first births in change in depressive symptoms from Wave 1 to Wave 4, after controlling for unobserved heterogeneity. In Model 2 the coefficient for the interaction term between teen birth status and adolescent pregnancy attitude was significant. This indicates that any change in depressive symptoms associated with having a teen first birth depends on attitudes toward pregnancy prior to the birth. These findings are entirely consistent with the findings from the lagged dependent variable analysis. The interaction term coefficient of -1.03 is similar to the coefficient from Model 3 in Table 2, which was -0.78. The fact that the lagged dependent variable and change score models produced such similar findings suggests that the results are not biased.

(Table 3 about here)

Table 4 presents the results of a series of OLS models testing the moderating effects of indicators of social disadvantage on the association between adolescent pregnancy attitudes and adult depressive symptoms among women who had teen first births. Models 1, 2, and 3 add three way interactions between teen birth status, adolescent pregnancy attitude, and, respectively, race/ethnicity, Wave 1 family receipt of public aid, and parental education. For simplicity I used the dichotomous adolescent pregnancy attitude indicator in these models. All three of these models include controls for Wave 1 depressive symptoms as well as the rest of the control variables, although the coefficients are not shown in Table 4 to conserve space. The three way interaction terms involving race/ethnicity and family receipt of public aid were all nonsignificant, indicating that the interactive effect of adolescent pregnancy attitudes and teen birth on adult depressive symptoms does not vary by race or poverty status. On the other hand, some of the coefficients in the model containing three way interactions with parental education

were significant. Due to the difficult nature of interpreting three-way interaction terms, I have chosen to present the results graphically, in Figure 3.

(Table 4 about here)

Figure 3 shows that adult depression does not differ meaningfully according to age at first birth and adolescent pregnancy attitudes for women whose parents had a high school or some college education. On the other hand, among women whose parents had less than a high school education, those who had positive adolescent pregnancy attitudes and went on to have teen births had significantly fewer depressive symptoms in adulthood than those who had positive adolescent pregnancy attitudes but waited until age 20 or older to have their first births. The same pattern is evident for women whose parents had college educations. Thus, it seems that having positive attitudes toward becoming pregnant in adolescence was beneficial for mental health after teen childbirth for women with poorly educated or highly educated parents, but made no difference for women with moderately educated parents. Notably, the group with the highest predicted level of depressive symptoms was women with less than high school educated parents, who had positive attitudes about pregnancy in adolescence but did not become mothers until age 20 or later.

(Figure 3 about here)

DISCUSSION

This study has three main findings. First, the hypothesis that teen childbearing would be associated with more depressive symptoms in adulthood compared to adult childbearing was not supported by the data. This result contradicts both conventional wisdom and some previous empirical evidence that teen childbearing is detrimental to mental health (e.g., Mirowsky and Ross 2002); however, it fits well within an emerging body of scholarship suggesting that any

negative association between teen childbearing and mental health can be explained by the selection of disadvantaged women into teen childbearing (e.g., Mollborn and Morningstar 2009; Taylor 2009).

Second, the results support the hypothesis that the association of teen childbearing with more depressive symptoms compared to adult childbearing would be weaker among those with more positive adolescent attitudes toward becoming pregnant. In fact, the results showed that among women who had more positive adolescent pregnancy attitudes, women who had teen first births were actually less depressed in adulthood than women who had their first births as adults. This finding was unexpected and suggests that teen childbearing may actually be beneficial to mental health for some women. This is consistent with the idea that life course expectations profoundly influence mental health adjustment to life events (Carlson and Williams 2011; Mossakowski 2011). It is also consistent with the predictions from stress process theory and self-discrepancy theory that cognitive appraisals of events and role occupancies matter for mental health adjustment (Pearlin 1999; Higgins 1987).

Third, the results partially support the hypothesis that the association of teen pregnancy attitudes with depressive symptoms after teen childbirth would vary by socioeconomic status, although they do not support the hypothesis that the association would vary by race/ethnicity. The significant three-way interaction between parental education, teen birth, and adolescent pregnancy attitudes shows that having positive attitudes toward becoming pregnant in adolescence was beneficial for mental health after teen childbirth for women with poorly educated (less than high school) or highly educated (four-year college or higher) parents, but made no difference for women with moderately educated parents. Some researchers have argued that among poor women, teen childbearing is considered normative and even viewed as a

positive step toward becoming an adult (e.g., Edin and Kefalas 2005). This could explain why teen childbearing led to greater declines in depressive symptoms than adult childbearing for women with poorly educated parents and positive adolescent pregnancy attitudes. In this context, the women who had positive attitudes toward becoming pregnant in adolescence but did not have teen first births may have been disappointed by their delayed transition to parenthood. Perhaps this is why the highest level of depressive symptoms was predicted for women with less than high school educated parents and positive adolescent pregnancy attitudes who had adult first births. It is much less clear why positive adolescent pregnancy attitudes would be associated with better mental health after teen childbirth for women with highly educated parents, but not for women with moderately educated parents. Certainly, this is an interesting pattern of findings that deserves more in-depth investigation.

Throughout this paper, I have posited that adolescent pregnancy attitudes shape mental health after teen childbirth through primarily psychological mechanisms by impacting levels of stressors, coping resources, and perceived self-discrepancy. It is important to note that, although the study was motivated by these theories, the positive findings cannot identify which mechanism produces the association. It is also possible that adolescents' responses to the pregnancy attitude question simply reflect their accurate observations about their social and material resources and ability to care for a child. In this case, the observed differences in depressive symptoms according to adolescent pregnancy attitudes would be caused by expected differences in the ability to marshal social and economic resources to care for a child. Those who did not have enough resources would confront problems, which would be damaging to mental health. Although this is a reasonable alternative explanation, I am inclined to place more emphasis on the psychological mechanisms suggested by stress process and self-discrepancy

theories. If the pregnancy attitudes measure was simply picking up on whether the adolescent had sufficient material resources to care for a child, I would have expected the coefficient for the interaction term between teen birth status and pregnancy attitudes to be substantially reduced by the inclusion of sociodemographic control variables, which did not happen. Nonetheless, future research should specifically investigate the mechanisms through which adolescent pregnancy attitudes moderate the relationship between teen childbearing and adult mental health.

There are some limitations to this study. First, I am concerned about attrition from the sample by Wave 4, and the possibility that teen mothers may have been more likely to drop out of the sample than other women. Second, since the adolescents were in grades 7-12 at Wave 1, some of the sample was already approaching the end of their teen years when the pregnancy attitudes measure was administered. This means that some women who had teen births had to be excluded from the sample because they had their first births before Wave 1. Third, it is a major limitation that the pregnancy attitudes question was only asked of adolescents aged 15 and older at Wave 1. Missing values for this question substantially reduced the sample size.

The final limitation I will discuss here is the problematic wording of the pregnancy attitudes question. The question asked adolescents to rate their agreement with the following statement: "It wouldn't be all that bad if you got pregnant at this time in your life." This is a leading question which suggests that becoming pregnant as an adolescent would be bad. Note that it is not possible to give an answer indicating that becoming pregnant would be good; it is only possible to strongly agree that it wouldn't be bad. However, while the question wording may have biased responses toward more negative pregnancy attitudes, I do not believe it would have changed the relative positions of individual respondents on the scale of pregnancy attitudes. In this case, the biased question wording should not threaten the validity of the results. Still, it

will be important for future research to replicate these findings using other measures of adolescent pregnancy attitudes.

In conclusion, it is extremely important to understand what shapes the mental health outcomes of women who experience teen births. Public opinion holds that teenage childbearing is universally detrimental to women and their children. This has led to public policies that strongly discourage teen childbearing and common conceptions of teen mothers as deviant. While I don't wish to downplay the importance of educating teens about avoiding pregnancy, I also hope to highlight the heterogeneity of women's experiences with teen childbearing and point out that teen childbearing may not be detrimental to all women. This analysis has made an important first step toward investigating the relationship between teen pregnancy attitudes and mental health adjustment after teen childbirth. The findings are provocative, suggesting that for women with positive adolescent pregnancy attitudes, teen childbearing is actually beneficial for mental health. Future research needs to investigate this relationship in more depth and using different data sources. If the results presented here hold up to further scrutiny, they have implications for public policies that strongly discourage teen births.

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Table 1. Weighted descriptive statistics for all variables in analysis by age at first birth.

	Full Sample	Teen Moms		Adult Moms
	Mean/% (st. dev.)	Mean/% (st. dev.)		Mean/% (st. dev.)
Dependent Variable				
Wave 4 CES-D scale (0-30)	6.36 (4.77)	7.03 (5.09)	*	6.19 (4.68)
Independent Variables				
Adolescent attitude toward becoming pregnant (0=most negative, 4=most positive)	0.84 (1.00)	1.05 (1.12)	***	0.79 (0.97)
Positive or neutral adolescent attitude toward becoming pregnant (0=negative attitude)	19.90%	25.07%	***	18.63%
Proportion teenager at first birth (0=20+ at first birth)	19.72%	---		---
Wave 1 Control Variables				
Wave 1 CES-D scale (0-30)	7.79 (5.20)	8.75 (5.28)	***	7.55 (5.15)
Race/Ethnicity				
White	70.10%	59.71%	***	72.65%
Black	17.71%	24.37%	**	16.07%
Hispanic	12.19%	15.93%		11.27%
Family receipt of public aid				
No public aid	71.56%	62.79%	***	73.72%
Public aid	12.77%	19.70%	**	11.07%
Unknown	15.67%	17.51%		15.21%
Education of resident parent				
Less than high school	14.56%	21.15%	***	12.94%
High school	33.25%	36.75%		32.39%

Some college	22.25%	19.82%		22.85%
Four-year college or higher	24.51%	15.77%	***	26.66%
Unknown	5.43%	6.52%		5.16%
Family structure				
Two biological or adoptive parents	49.32%	34.56%	***	52.95%
Step-family	18.44%	24.19%	**	17.03%
Single parent	25.36%	30.99%	*	23.98%
Other	6.88%	10.26%	*	6.05%
Religiosity	3.07	3.09		3.06
(1=not important at all, 4=very important)	(1.06)	(1.07)		(1.06)
Age	16.48	15.90	***	16.62
	(1.17)	(0.97)		(1.17)
Time in months from wave 1 to first birth	76.00	27.97	***	87.80
	(40.43)	(11.89)		(35.80)
Wave 4 Control Variables				
Proportion married at first birth	49.46%	20.66%	***	56.54%
Proportion cohabiting at first birth	24.03%	29.45%	**	22.70%
n (Unweighted)	2683	554		2129

*p≤0.05, **p≤0.01, ***p≤0.001 (Indicates significant mean difference between women who had teen and adult first births)

Table 2. Weighted OLS regressions of adult depressive symptoms on adolescent attitude toward becoming pregnant and controls.

VARIABLES	Wave 4 Depressive Symptoms		
	(1)	(2)	(3)
Adolescent attitude toward becoming pregnant (0-4)	0.10	0.39**	0.29*
	(0.11)	(0.14)	(0.14)
Teenager at first birth (*Ref* = 20+ at first birth)	-0.26	1.36**	0.57
	(0.47)	(0.47)	(0.58)
Pregnancy attitude X teenager at birth		-0.90**	-0.78*
		(0.33)	(0.33)
Wave 1 CES-D scale	0.25***	0.27***	0.25***
	(0.03)	(0.03)	(0.03)
Race/Ethnicity (*Ref* = white)			
Black	0.53		0.47
	(0.38)		(0.37)
Hispanic	0.21		0.22
	(0.35)		(0.34)
Wave 1 family receipt of public aid (*Ref* = no aid)			
Public aid	0.23		0.22
	(0.47)		(0.46)
Unknown	-0.49		-0.44
	(0.33)		(0.33)
Wave 1 parental education (*Ref* = less than high school)			
High school	0.08		0.09
	(0.36)		(0.36)
Some college	-0.16		-0.15
	(0.44)		(0.45)
Four-year college or higher	-0.28		-0.22
	(0.42)		(0.43)
Unknown	0.22		0.12
	(0.80)		(0.80)
Wave 1 family structure (*Ref* = two parents)			
Step-family	0.64*		0.63*
	(0.32)		(0.32)
Single parent	-0.02		-0.02
	(0.33)		(0.32)
Other	0.44		0.51
	(0.66)		(0.68)

Wave 1 religiosity (1-4)	-0.06		-0.06
	(0.11)		(0.11)
Wave 1 age	0.01		0.01
	(0.13)		(0.13)
Time in months from wave 1 to first birth	-0.01		-0.01
	(0.004)		(0.004)
Married at first birth (*Ref* = unmarried)	-0.52		-0.57
	(0.33)		(0.33)
Cohabiting at birth (*Ref* = not cohabiting)	-0.02		-0.04
	(0.38)		(0.39)
Constant	5.11*	3.86***	4.74*
	(2.33)	(0.26)	(2.33)
n	2683	2683	2683
R-squared	0.11	0.10	0.11

Standard errors in parentheses *p≤0.05, **p≤0.01, ***p≤0.001

Table 3. Weighted fixed effects models predicting adult depressive symptoms.

VARIABLES	Wave 4 Depressive Symptoms	
	(1)	(2)
Teenager at first birth (*Ref* = 20+ at first birth)	-0.36	0.73
	(0.34)	(0.48)
Pregnancy attitude (0-4) X teenager at birth		-1.03**
		(0.34)
Age	-0.11***	-0.11***
	(0.02)	(0.02)
Constant	9.53***	9.53***
	(0.37)	(0.37)
Sigma_u	4.02	4.03
Sigma_e	4.18	4.17
Rho	0.48	0.48
Number of observations	5366	5366
Number of groups	2683	2683

Standard errors in parentheses *p≤0.05, **p≤0.01, ***p≤0.001
Note: standard errors were adjusted for clustered sample design

Table 4. Weighted OLS regressions of adult depressive symptoms with three-way interactions by race/ethnicity, family receipt of public aid, and parental education.

VARIABLES	Wave 4 Depressive Symptoms		
	(1)	(2)	(3)
Positive or neutral adolescent attitude toward becoming	0.20	0.52	3.15**
pregnant (*Ref* = negative attitude)	(0.42)	(0.39)	(1.15)
Teenager at first birth (*Ref* = 20+ at first birth)	-0.02	0.38	1.20
	(0.65)	(0.58)	(0.90)
Positive/neutral pregnancy attitude X teenager at birth	-1.29	-2.40**	-5.28**
	(0.94)	(0.76)	(1.90)
Race/Ethnicity (*Ref* = white)			
Black	0.24	0.49	0.46
	(0.44)	(0.37)	(0.36)
Hispanic	-0.18	0.25	0.33
	(0.38)	(0.34)	(0.34)
Wave 1 family receipt of public aid (*Ref* = no aid)			
Public aid	0.24	-0.07	0.30
	(0.46)	(0.51)	(0.46)
Unknown	-0.45	-0.21	-0.49
	(0.32)	(0.44)	(0.33)
Wave 1 parental education (*Ref* = less than high school)			
High school	0.06	0.06	0.68
	(0.37)	(0.38)	(0.40)
Some college	-0.18	-0.19	0.63
	(0.45)	(0.46)	(0.52)
Four-year college or higher	-0.28	-0.25	0.40
	(0.43)	(0.44)	(0.45)
Unknown	0.06	0.14	0.90
	(0.80)	(0.83)	(1.01)
Race/Ethnicity Interactions			
Black X teenager at birth	0.51		
	(0.97)		
Hispanic X teenager at birth	0.94		
	(0.84)		
Black X positive/neutral pregnancy attitude	0.86		
	(0.77)		
Hispanic X positive/neutral pregnancy attitude	1.44		
	(0.78)		
Black X teen birth X pos./neutral pregnancy attitude	-1.46		

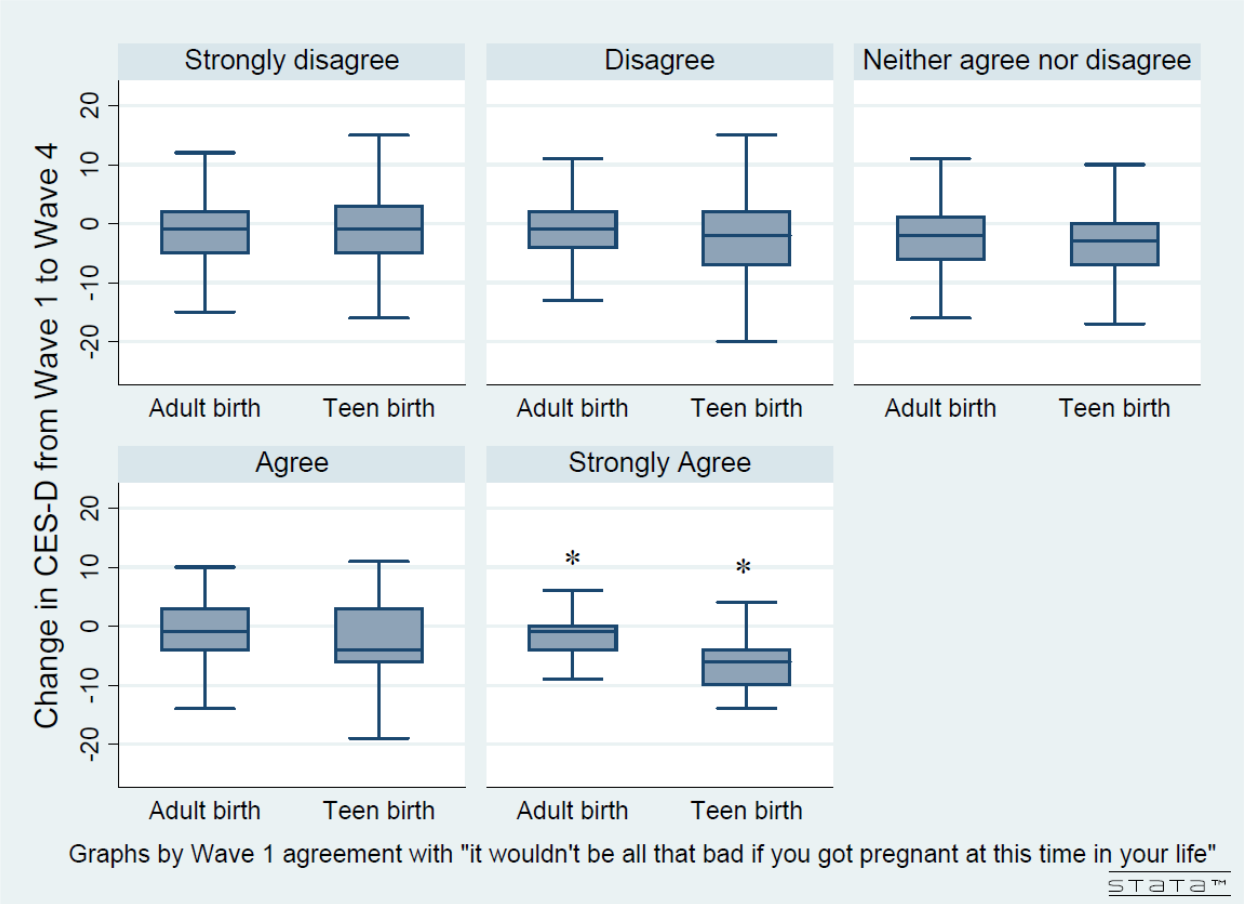
	(1.53)		
Hispanic X teen birth X pos./neutral pregnancy attitude	-1.63		
	(1.99)		
Public Aid Interactions			
Public aid X teenager at birth		0.14	
		(1.34)	
Unknown public aid X teenager at birth		-1.31	
		(1.04)	
Public aid X positive/neutral pregnancy attitude		1.11	
		(1.25)	
Unknown public aid X positive/neutral pregnancy attitude		-0.64	
		(0.88)	
Public aid X teen birth X pos./neutral pregnancy attitude		0.003	
		(2.81)	
Unknown aid X teen birth X pos./neutral preg. attitude		2.81	
		(1.54)	
Parental Education Interactions			
Parent high school X teenager at birth			-1.02
			(0.96)
Parent some college X teenager at birth			-1.28
			(1.18)
Parent college or more X teenager at birth			-0.90
			(1.26)
Unknown parent education X teenager at birth			-2.43
			(1.47)
Parent high school X pos./neutral preg. attitude			-2.90*
			(1.25)
Parent some college X pos./neutral preg. attitude			-3.71*
			(1.42)
Parent college or more X pos./neutral preg. attitude			-2.59
			(1.39)
Unknown parent education X pos./neutral preg. attitude			-2.44
			(1.58)
Parent high school X teen birth X preg. attitude			4.56*
			(2.10)
Parent some college X teen birth X preg. attitude			5.40*
			(2.44)
Parent college or more X teen birth X preg. attitude			1.85
			(2.36)
Unknown parent education X teen birth X preg. attitude			3.63
			(2.79)

Constant	5.02*	4.77*	4.23
	(2.36)	(2.30)	(2.35)
n	2683	2683	2683
R-squared	0.12	0.12	0.12

Standard errors in parentheses *p≤0.05, **p≤0.01, ***p≤0.001

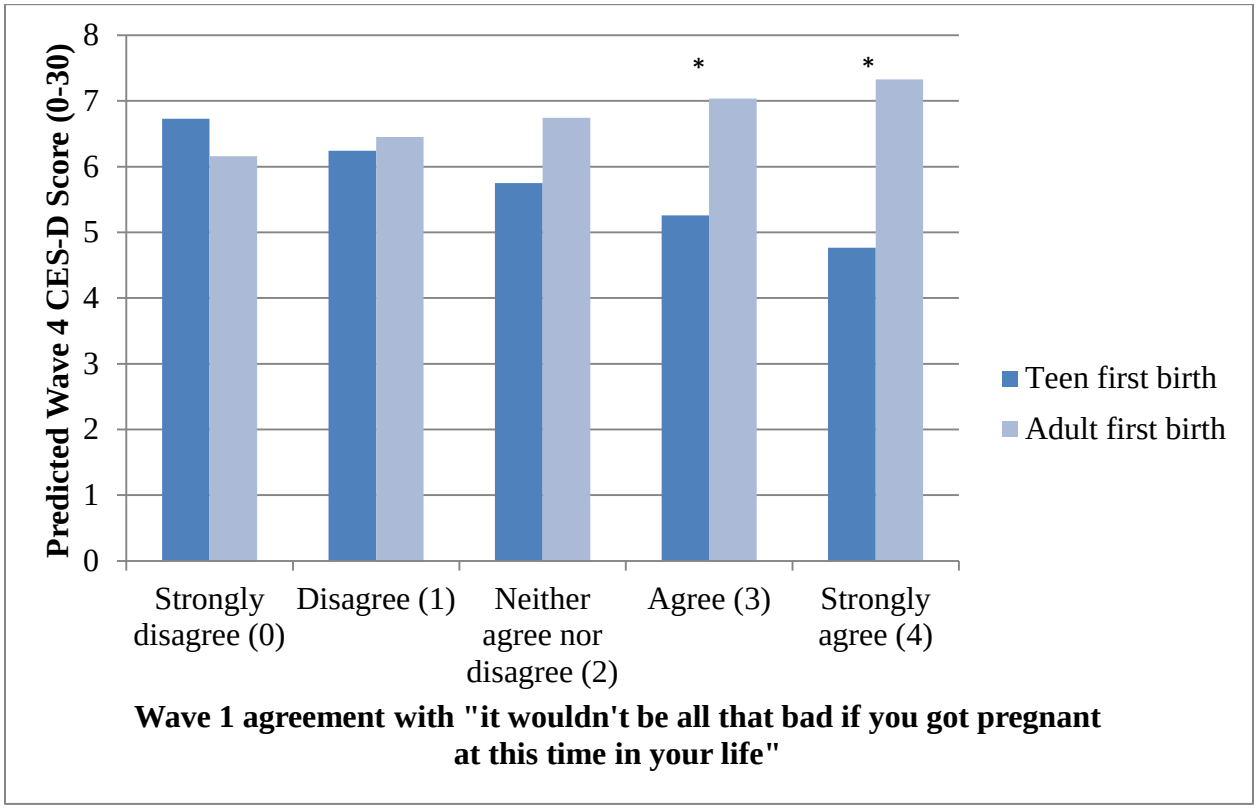
Note: models include all control variables, coefficients not shown

Figure 1. Weighted boxplots of mean change in CES-D score from Wave 1 to Wave 4, by adolescent pregnancy attitude and teen birth status.



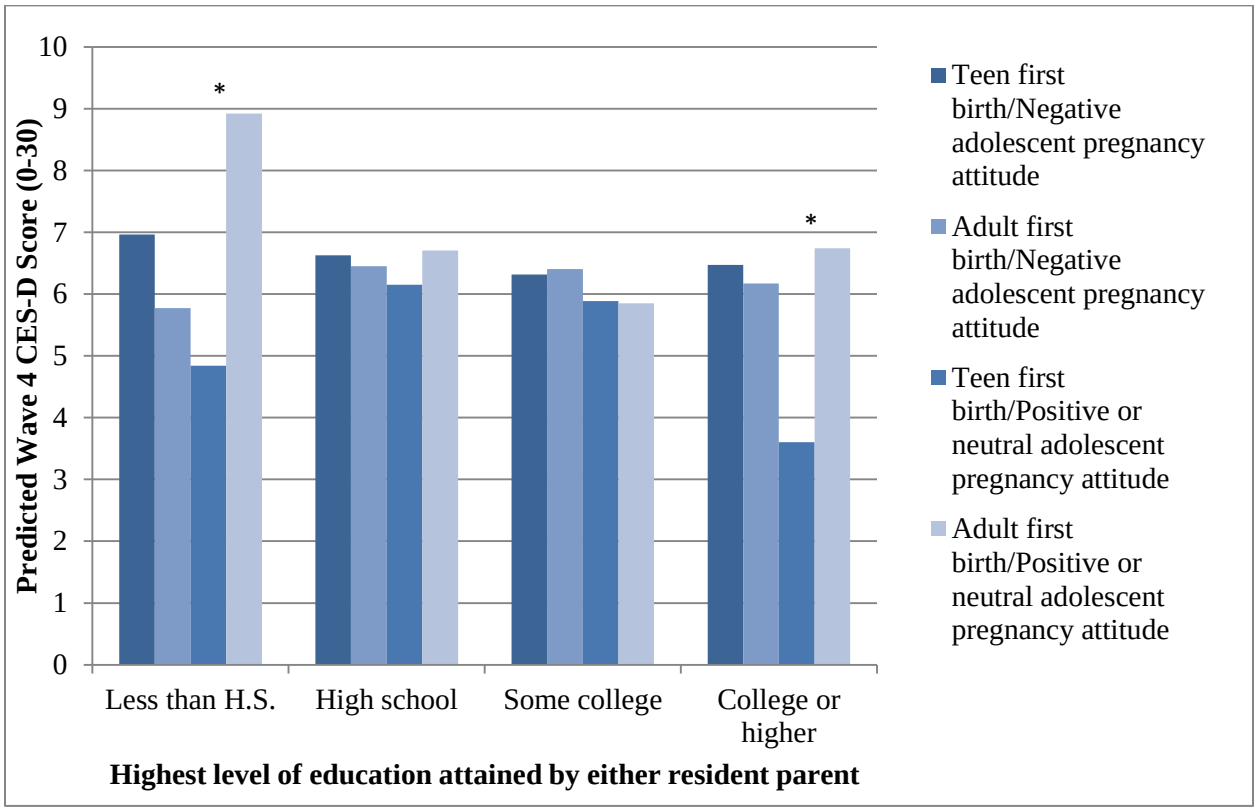
*indicates significant ($p \leq 0.05$) difference between women with teen and adult first births

Figure 2. Predicted values for Wave 4 depressive symptoms among women who had teen and adult first births, by adolescent attitude toward becoming pregnant, holding other variables at their means.



*indicates significant ($p \leq 0.05$) difference between women with teen and adult first births

Figure 3. Three-way interaction between teen birth, teen pregnancy attitude, and parental education in predicting Wave 4 depressive symptoms, holding other variables at their means.



*indicates significant ($p \leq 0.05$) difference between women with teen and adult first births